Avaya Solution & Interoperability Test Lab

Application Notes for CyberPath PowerPath POE4424 Power over Ethernet (PoE) Switch with Avaya IP Telephones and Avaya Wireless Access Points – Issue 1.1

Abstract

These Application Notes describe the procedures for configuring the CyberPath PowerPath POE4424 switch to provide inline Power over Ethernet (PoE) to Avaya IP Telephones and Avaya Wireless Access Points. During compliance testing, Avaya IP Telephones and Wireless Access Points successfully obtained power and transferred data over standard Ethernet cables from a CyberPath PowerPath POE4424 switch. Information in these Application Notes has been obtained through compliance testing and additional technical discussions. Testing was conducted via the Developer*Connection* Program at the Avaya Solution and Interoperability Test Lab.

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1. Introduction

Power over Ethernet (PoE) allows both power and data to be simultaneously carried over standard Ethernet cables. PoE-enabled Ethernet switches can supply power directly to Ethernet devices, thereby simplifying installation and removing the need for separate power supplies for those devices. The IEEE 802.3af standard defines the mechanisms for Power Sourcing Equipment (PSE), such as PoE-enabled Ethernet switches, to detect, classify, and supply power to Powered Devices (PDs), such as PoE-enabled IP telephones and wireless access points. In the compliance-tested configuration described in these Application Notes, a CyberPath PowerPath POE4424 switch is a PSE configured to supply inline PoE to Avaya PDs, specifically Avaya IP Telephones and Avaya AP-8 Wireless Access Points.

As illustrated in **Figure 1**, the Avaya PDs covered in these Application Notes include the following:

- 4601 IP Telephone
- 4602 IP Telephone and 4602SW IP Telephones
- 4610SW IP Telephone
- 4620 IP Telephone
- 4620SW IP Telephone
- 4621SW IP Telephone
- 4622SW IP Telephone
- 4625SW IP Telephone
- 4630SW IP Telephone
- 5601 IP Telephone
- 5602SW IP Telephone
- Avaya Gen-2 4606, 4612, and 4624 IP Telephones
- Avaya Wireless AP-8 802.11a/b/g Access Point

The Avaya 4612 and 4624 IP Telephones can be identified as Gen-2 by inspecting the model number. "2A" in the model number indicates Gen-2. The model number can be found by:

- Inspecting the label attached to the bottom of the Telephone.

OR

- Pressing **Mute**, **V**, **I**, **E**, **W**, **#** on the keypad and then pressing ***** until the model number appears. Press **#** to exit.

An example of a model number is 4612D0**2A**-003 (Gen-2).

The Avaya 4620SW Class 2 and Class 3 IP Telephones can be differentiated by the microphone at the bottom right side of the Telephone. If the microphone has one hole, it is Class 2, and if it has two holes, it is Class 3.

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The classifications of the phones are dependent on the Institute of Electrical and Electronics Engineers (IEEE) 802.3af classifications for Powered Devices such as Avaya IP Telephones. Each Powered Device is classified by the amount of power that it consumes into one of the IEEE's five classes. (The IEEE 802.3af PSE and Powered-Device Power Classifications chart can be seen in Table 2).

The powering tests included verification of the following after the product was connected to the switch:

- Successful boot operation.
- For Avaya IP Telephones, successful registration with Avaya Communication Manager or Avaya IP Office (for the Avaya 5600-Series IP Telephones), completion of a test call, and raising speakerphone volume to maximum value.
- For the Wireless LAN Access Point, successful registration of an Avaya IP Softphone and an Avaya 3616 Wireless Telephone with Avaya Communication Manager and completion of a test call.
- Connecting a mix of 22 Avaya IP Telephones and an Avaya AP-8 Wireless Access Point to the switch, power cycling the switch and verifying successful boot operation and registration of the devices to the Avaya Communication Manager.

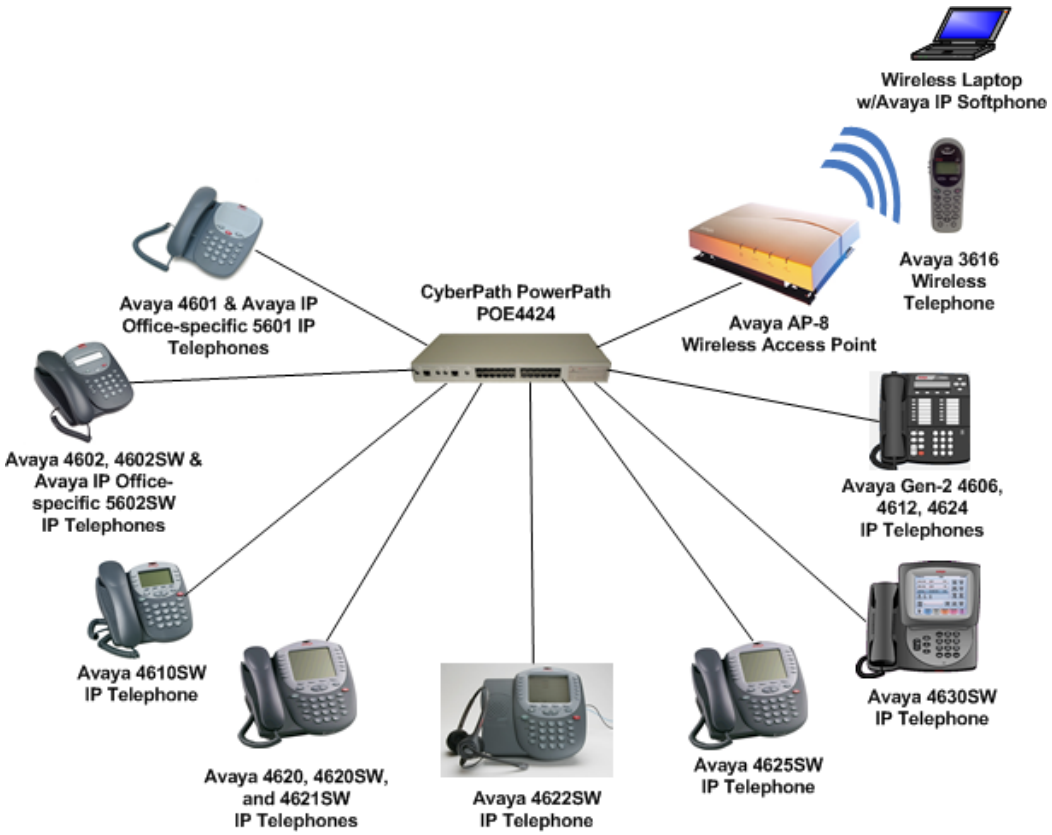

Figure 1: PoE Interoperability Between CyberPath PowerPath POE4424 and Avaya IP Telephones and Avaya Wireless Access Points

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2. Equipment and Software Validated

The following equipment and software/firmware were used for the sample configuration provided:

Equipment	Software/Firmware
Avaya S8300 Media Server in a G700 Media Gateway	2.2/3.0
Avaya IP Office 412	3.0(40)
Avaya 4601 IP Telephone	1.8.0
Avaya 4602 IP Telephone	1.8.2
Avaya 4602SW IP Telephone	1.8.2
Avaya 4610SW IP Telephone	2.1.3
Avaya 4620 IP Telephone	2.1.3
Avaya 4620SW IP Telephone	2.1.3
Avaya 4621SW IP Telephone	2.2
Avaya 4622SW IP Telephone	2.2
Avaya 4625SW IP Telephone	2.5
Avaya 4630SW IP Telephone	2.0.2
Avaya 5601 IP Telephone (IP Office specific)	1.810
Avaya 5602SW IP Telephone (IP Office specific)	1.806
Avaya Gen-2 4606 IP Telephone	1.8.2
Avaya Gen-2 4612 IP Telephone	1.8.2
Avaya Gen-2 4624 IP Telephone	1.8.2
Avaya AP-8 Wireless Access Point	2.6.0(914)
Avaya IP Softphone	5.2.3.6
Avaya Voice Priority Processor	33/02
Avaya 3616 Wireless Telephone	096.040
CyberPath PowerPath POE4424	2.03.0.11PoE

3. Configure Inline Power over Ethernet on the POE4424

Inline Power over Ethernet (PoE) is supported on the POE4424. By default, PoE support is enabled on all the POE4424 10/100 BaseT ports. Power over Ethernet can be configured on the POE4424 via the browser interface or command line interface (CLI). To view and/or configure PoE settings on the POE4424 via the browser interface:

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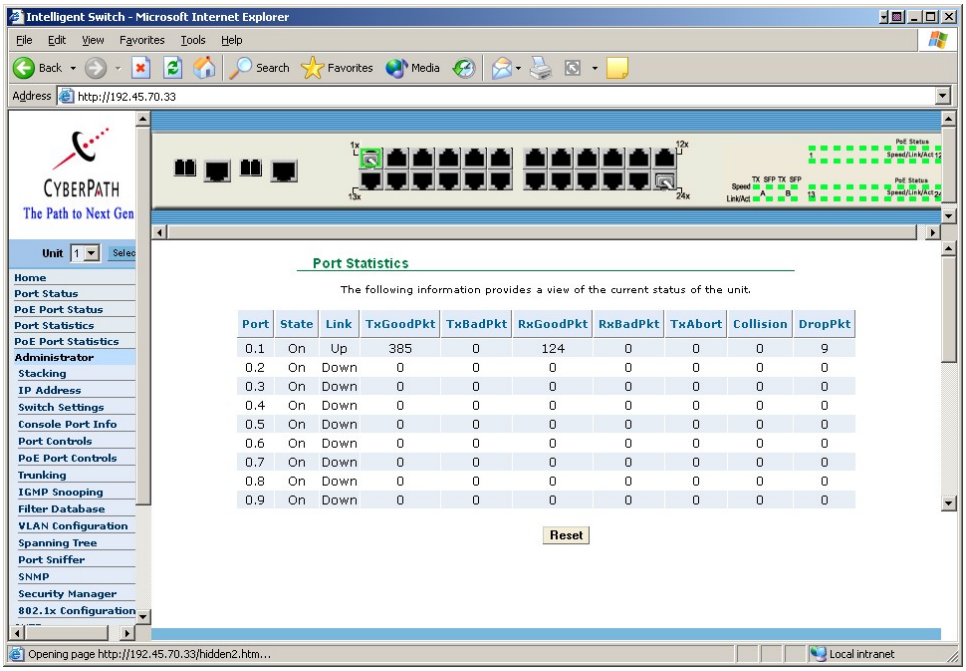
1. Browse to the IP address configured for the POE4424 and log into the POE4424 using the appropriate administrative privileges.

2. Click **Administrator** on the left hand pane to open the list of administrative functions available on the POE4424.


Intelligent Switch - Microsoft Internet Explorer
Address http://192.45.70.33
CYBERPATH
The Path to Next Gen
Home
Port Status
PoE Port Status
Port Statistics
PoE Port Statistics
Administrator
Stacking
IP Address
Switch Settings
Console Port Info
Port Controls
PoE Port Controls
Trunking
IGMP Snooping
Filter Database
VLAN Configuration
Spanning Tree
Port Sniffer
SNMP
Security Manager
802.1x Configuration
Port Statistics
The following information provides a view of the current status of the unit.
Port State Link TxGoodPkt TxBadPkt RxGoodPkt RxBadPkt TxAbort Collision DropPkt
0.1 On Up 385 0 124 0 0 0 9
0.2 On Down 0 0 0 0 0 0 0
0.3 On Down 0 0 0 0 0 0 0
0.4 On Down 0 0 0 0 0 0 0
0.5 On Down 0 0 0 0 0 0 0
0.6 On Down 0 0 0 0 0 0 0
0.7 On Down 0 0 0 0 0 0 0
0.8 On Down 0 0 0 0 0 0 0
0.9 On Down 0 0 0 0 0 0 0
Reset
Opening page http://192.45.70.33/hidden2.htm...
Local intranet

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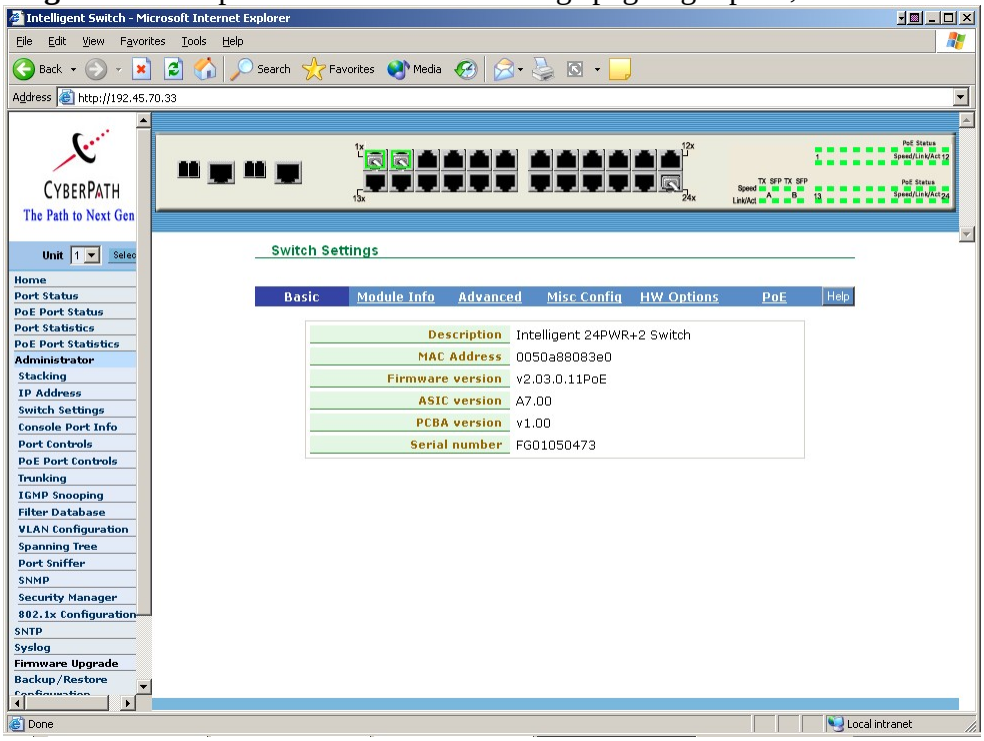
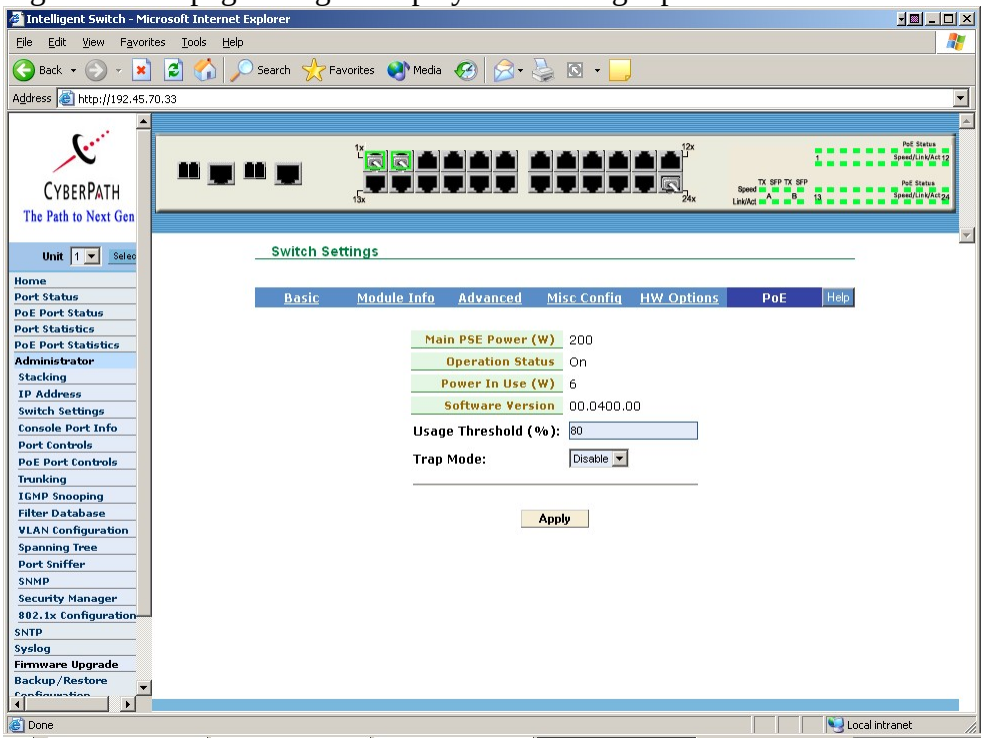
3. To configure the POE4424's PoE Usage Threshold and/or SNMP PoE Trap, click **Switch Settings** on the left pane. In the Switch Settings page right pane, click the **PoE** tab.



4. The power usage for the POE4424, **Usage Threshold %** and **Trap Mode**, can be configured in the page that gets displayed on the right pane.



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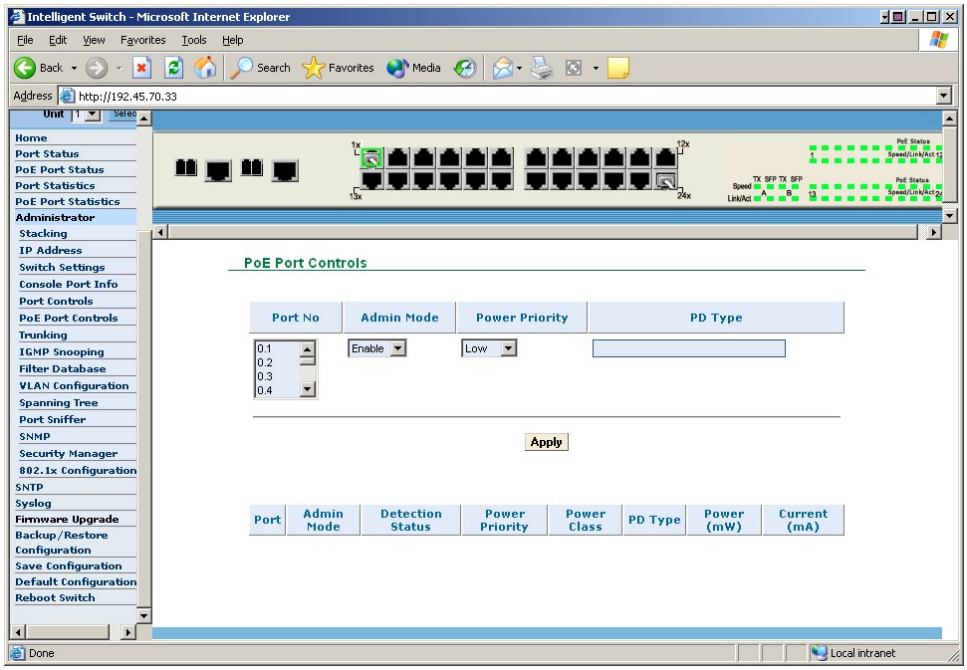
5. Click **PoE Port Controls** in the left hand pane to configure PoE settings for a specific port.



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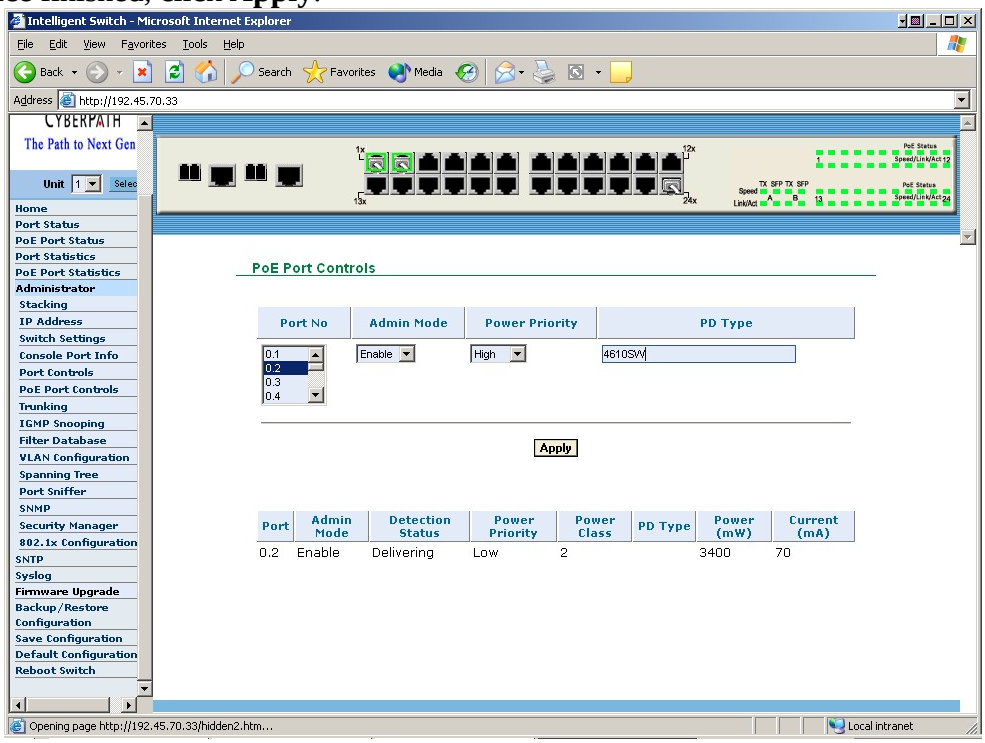
6. In the page that appears on the right hand pane, scroll to the desired port number. Select the **Power Priority** to assign to the port (Low, High, and Critical) and enter the **PD Type** (optional) for the port, for example, the phone type or other descriptive information. Once finished, click **Apply**.



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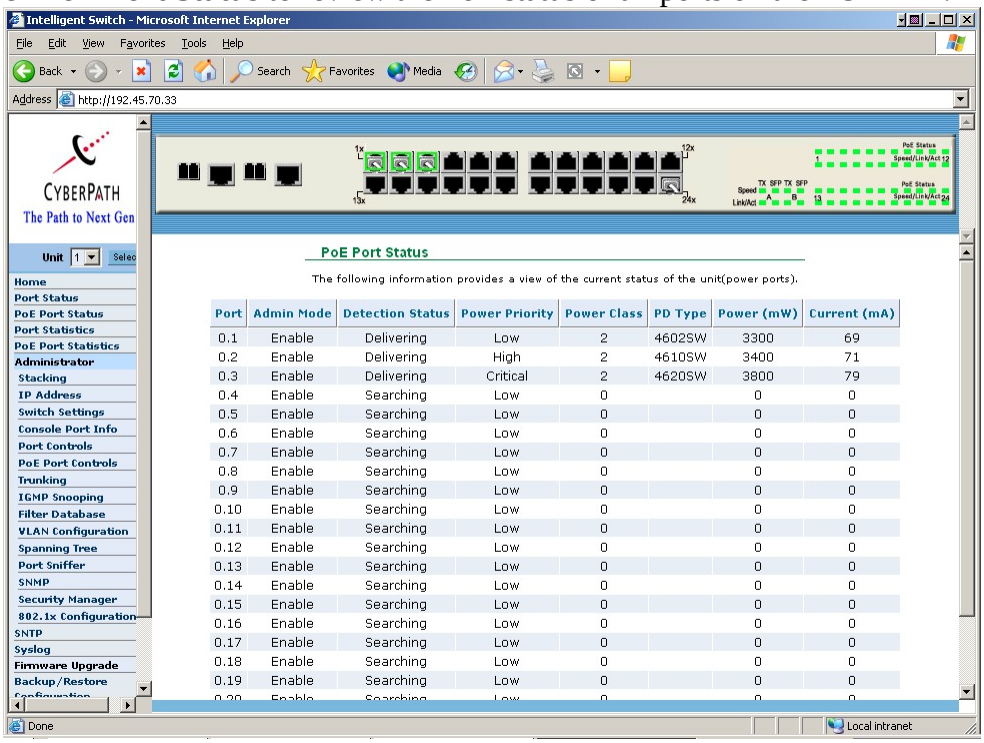
7. Click **PoE Port Status** to review the PoE status of all ports on the POE4424.


Intelligent Switch - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Address http://192.45.70.33
CyberPath
The Path to Next Gen
Unit 1
Home
Port Status
PoE Port Status
Port Statistics
PoE Port Statistics
Administrator
Stacking
IP Address
Switch Settings
Console Port Info
Port Controls
PoE Port Controls
Trunking
IGMP Snooping
Filter Database
VLAN Configuration
Spanning Tree
Port Sniffer
SNMP
Security Manager
802.1x Configuration
SNTP
Syslog
Firmware Upgrade
Backup/Restore
PoE Port Status
The following information provides a view of the current status of the unit(power ports).
Port | Admin Mode | Detection Status | Power Priority | Power Class | PD Type | Power (mW) | Current (mA)
0.1 | Enable | Delivering | Low | 2 | 4602SW | 3300 | 69
0.2 | Enable | Delivering | High | 2 | 4610SW | 3400 | 71
0.3 | Enable | Delivering | Critical | 2 | 4620SW | 3800 | 79
0.4 | Enable | Searching | Low | 0 | | 0 | 0
0.5 | Enable | Searching | Low | 0 | | 0 | 0
0.6 | Enable | Searching | Low | 0 | | 0 | 0
0.7 | Enable | Searching | Low | 0 | | 0 | 0
0.8 | Enable | Searching | Low | 0 | | 0 | 0
0.9 | Enable | Searching | Low | 0 | | 0 | 0
0.10 | Enable | Searching | Low | 0 | | 0 | 0
0.11 | Enable | Searching | Low | 0 | | 0 | 0
0.12 | Enable | Searching | Low | 0 | | 0 | 0
0.13 | Enable | Searching | Low | 0 | | 0 | 0
0.14 | Enable | Searching | Low | 0 | | 0 | 0
0.15 | Enable | Searching | Low | 0 | | 0 | 0
0.16 | Enable | Searching | Low | 0 | | 0 | 0
0.17 | Enable | Searching | Low | 0 | | 0 | 0
0.18 | Enable | Searching | Low | 0 | | 0 | 0
0.19 | Enable | Searching | Low | 0 | | 0 | 0
Done
Local intranet

Alternatively, the following CLI commands can be used to explicitly enable PoE support on one or all ports, configure the PoE priority of one or all ports, as well as allow users to attach a text string to identify the location and type of PD connected to one or all PoE ports.

```
config inlinepower adminmode <slot.port/all> enable
config inlinepower priority <slot.port/all> <critical/high/low>
config inlinepower type <slot.port/all> <string>
```

Enter the command **show inlinepower switch** to view PoE settings for the switch.

```
(L2SW) >show inlinepower switch

Main PSE Power (W) ..................... 200
Operation Status ....................... On
Power In Use (W) ....................... 3
Usage Threshold (%) .................... 80
Trap Mode .............................. Disable
Software Version ....................... 00.0400.00
```

Enter the command **show inlinepower port summary <slot.port/all>** to verify that PoE support is enabled on one or all ports. The output of the command shown below displays the admin mode, status, priority, detected 802.3af class, and defined PD type for all ports.

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```
(L2SW) >show inlinepower port summary all

     Admin   Detection   Power    Power
Port Mode    Status      Priority Class PD Type
---- ------  ----------- -------- ----- ----------------------------------
0.1  Enable  Delivering  Low      2    4602SW
0.2  Enable  Delivering  High     2    4610SW
0.3  Enable  Delivering  Critical 2    4620SW
0.4  Enable  Searching   Low      0
0.5  Enable  Searching   Low      0
0.6  Enable  Searching   Low      0
0.7  Enable  Searching   Low      0
0.8  Enable  Searching   Low      0
0.9  Enable  Searching   Low      0
0.10 Enable  Searching   Low      0
0.11 Enable  Searching   Low      0
0.12 Enable  Searching   Low      0
0.13 Enable  Searching   Low      0
0.14 Enable  Searching   Low      0
0.15 Enable  Searching   Low      0
0.16 Enable  Searching   Low      0
0.17 Enable  Searching   Low      0
0.18 Enable  Searching   Low      0
0.19 Enable  Searching   Low      0
0.20 Enable  Searching   Low      0
0.21 Enable  Searching   Low      0
0.22 Enable  Searching   Low      0
0.23 Enable  Searching   Low      0
0.24 Enable  Searching   Low      0
```

For more detailed inline power information for one or all ports, enter the command **show inlinepower port detailed <slot.port/all>**. The following screen shows a detailed listing of the PoE settings for port 0.1.

```
(L2SW) >show inlinepower port detailed 0.1

Admin Mode ............................... Enable
Detection Status ......................... Delivering
Power Priority ........................... Low
Power Class .............................. 2
PD Type ..................................
MPS Absent Count ......................... 0
Invalid Signature Count .................. 0
Power Denied Count ....................... 0
Overload Count ........................... 0
Short Count .............................. 0
Power (mW) ............................... 3300
Current (mA) ............................. 69
```


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4. Interoperability Compliance Testing

The interoperability compliance testing focused on verifying PoE interoperability between the CyberPath PowerPath POE4424 and Avaya IP Telephones and Avaya AP-8 Wireless Access Point.

4.1. General Test Approach

The general test approach was to connect the Avaya PDs (Avaya IP Telephones and Avaya AP-8 Wireless Access Point) to PoE-enabled ports on the CyberPath PowerPath POE4424 and verify that the PDs successfully boot. To verify that power and data can be simultaneously carried on the PoE connections, phone calls were made from the IP Telephones to / from a 3616 Wireless Telephone accessing the network via the AP-8 as well as to/from an IP Softphone on a wireless laptop accessing the network via the AP-8.

4.2. Test Results

Most Power over Ethernet test cases completed successfully. The only issue encountered was with the 5602SW IP Telephone as documented in **Note 2** below. The CyberPath PowerPath POE4424 successfully provided inline power to the Avaya PDs. **Table 1** below lists the 802.3af class, allocated power, and measured power of the Avaya PDs when connected to the CyberPath PowerPath POE4424. The measured power listed is for the particular phone being tested. Cable length and impedance affects power usage, so the measurements listed here may vary based on the cable used.

Avaya Powered Device	802.3af Class	Allocated Power (W)	Measured Power (mW)		Observations
			Idle	Spkr max vol	
4601	2	7	3100	-	See Note 1
4602	1	4	3100	3800	
4602SW	2	7	3200	4000	
4610SW	2	7	3200	3700	
4620	3	15.4	7000	7300	
4620SW (Post 11/2004)	2	7	5000	5400	
4621SW	2	7	5100	-	
4622SW	2	7	5100	5600	
4625SW	3	15.4	7900	8400	
4630SW	3	15.4	10700	11100	
5601	2	7	3100	-	See Note 1
5602SW	1	4	3300	-	See Note 2
Gen-2 4606	0	15.4	5000	5100	
Gen-2 4612	0	15.4	4800	5100	
Gen-2 4624	0	15.4	4900	5100	
AP-8	0	15.4	4200	-	See Note 3

Table 1: 802.3af Class, Allocated Power, and Measured Power for Avaya IP Telephones and Wireless Access Point connected to CyberPath POE4424.

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Table 2 below summarizes the 802.3af classes.

Class	PSE Output Max. Power (W)
0	15.4
1	4.0
2	7.0
3	15.4
4	Treat as Class 0

Table 2: IEEE 802.3af PSE and Powered-Device Power Classifications

Note 1: The 4601 and 5601 IP Telephones do not have a speakerphone button.

Note 2: The 5602SW IP Telephone used in the lab registered as a Class 1 device but should register as Class 2. Since the POE4424 rate caps its ports, when the Speaker volume is maxed on the 5602SW, the POE4424 reports a FAULT on the port because the phone draws more power than permitted for its class and resets the port. CyberPath does not currently provide a method for overriding the port setting.

Note 3: Power drawn by AP-8 during the wireless IP Softphone call to an IP Phone is 4100 mW. Power drawn during wireless IP Softphone call to 3616 Wireless Telephone is 5200 mW.

5. Verification Steps

The following steps may be used to verify the configuration:

1. Ensure that PoE has been enabled on the CyberPath POE4424 and the ports that serve the PDs.
2. Connect the Avaya PD to a PoE enabled port on the CyberPath POE4424 and verify that the PD powers on successfully. If the PD does not power on, enter the command **show inlinepower port summary** <slot.port/all> to confirm PoE is enabled on the port.
3. Verify that the Avaya 4600 Series IP Telephones successfully register with Avaya Communication Manager and complete phone calls to other phones (assumes the IP telephones have been configured with the correct IP and call control information).
4. Verify that the Avaya 5600 Series IP Telephones successfully register with Avaya IP Office and complete phone calls to other phones (assumes the IP telephones have been configured with the correct IP and call control information).
5. Verify the Avaya Wireless Access Point by having an Avaya IP Softphone running on a wireless laptop accessing the network via the Access Point successfully register with Avaya Communication Manager and complete phone calls to other phones (assumes the IP Softphone has been configured with the correct IP and call control information).
6. Verify the Avaya IP Telephone continues to function properly when the speakerphone volume is turned up to max value.

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7. Verify the POE4424 powers up a mix of 23 Avaya IP Telephones. Connect up to 23 Avaya IP Telephones to the POE4424. Connect the 24th port of the POE4424 to an upstream switch. Connect the Avaya Communication Manager, DHCP Server and/or Avaya IP Office to the upstream switch. Power cycle the POE4424 and verify all the Avaya IP Telephones successfully power up and register to their corresponding switch.

6. Support

For technical support on CyberPath products, consult the support pages at http://www.cyberpathinc.com or contact the CyberPath Customer Support Center at:

- Phone: 732-463-7700 ext. 221
- E-mail: support@cyberpathinc.com

7. Conclusion

These Application Notes describe the steps for configuring the CyberPath PowerPath POE4424 to provide inline Power over Ethernet (PoE) to the Avaya PDs, namely Avaya IP Telephones and Avaya Wireless Access Points. During compliance testing, the Avaya PDs simultaneously obtained power and transferred data over standard Ethernet cables from the CyberPath PowerPath POE4424.

8. Additional References

- Product documentation for Avaya products may be found at http://support.avaya.com.

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